Acta Zootaxonomica Sinica, 31 (1): 193- 199 (Jan., 2006) ISSN 1000-0739
动物分类学报

漠尺蛾属研究及一新种记述 (鳞翅目, 尺蛾科, 灰尺蛾亚科)

薛大勇[1] 施登明[2] 邢海洪[3] 韩红香[1] 李桂花[3]

1. 中国科学院动物研究所 北京 100080, E-mail: xuedy@ioz.ac.cn
2. 新疆农业大学林学院 乌鲁木齐 830052
3. 新疆石河子市森林病虫害防治检疫站 石河子 832000

摘 要 记述了漠尺蛾属 *Desertobia* Viidalepp, 1989 的所有种类, 共 3 种, 包括 1 新种 *D. heloxylonia* Xue, sp. nov., 提供了所有种类的成虫形态图。*D. heloxylonia* 在新疆为害沙漠植物梭梭, 详细描述了新种的外部形态特征、雌雄外生殖器特征、及鉴别特征, 并描述了从卵至蛹的外部形态, 附有形态及生态学照片。

关键词 尺蛾科, 灰尺蛾亚科, 漠尺蛾属, 新种, 中国, 沙漠, 梭梭.
中图分类号 Q969.42

漠尺蛾属 *Desertobia* Viidalepp, 1989 是一个主要生活在沙漠环境中的小属, Viidalepp (1989) 记载本属时包括两种, 即 *D. nocturna* Viidalepp 和 *D. kozlovae* Viidalepp。此后未见有关本属的报道。虽然 *D. kozlovae* 发现于中国内蒙西部, 但国内尚未有报道, 更无相关研究。近年新疆一种严重为害沙漠植物梭梭的尺蛾引起重视, 经鉴定为本属 1 新种。本文简要记述漠尺蛾属的概况并记述该新种。模式标本主要保藏在中国科学院动物研究所 (北京); 副模各 1 对分别保藏在新疆农业大学林学院标本馆 (乌鲁木齐) 和新疆石河子市森林病虫害防治检疫站 (石河子)。

漠尺蛾属 Desertobia **Viidalepp, 1989**

Desertobia Viidalepp, 1989. *Trudy zool. Inst. Leningr.*, 200: 94.
Type species: *Desertobia nocturna* Viidalepp, 1989.

外部形态 额略凸出或平坦, ♂宽于复眼直径, ♀宽于复眼直径的 2 倍; 喙完全消失, 下唇须弱小, 几乎不可见; ♂触角丝状, 具长纤毛簇。胸部略宽, 腹部细; 足无特化, 后足胫距两对。腹听器退化。第 1 腹节背板有 1 排小刺, 第 2、3 腹节背板前缘各有 1 排大刺。翅狭长, 中室长约为翅长的 3/5。前翅 R_1 和 R_2 分别出自中室 1/2 和 3/4 处的外侧, R_1 自由或与 Sc 合并, R_2 自由或与 R_1 有 1 段合并; R_{3-5} 在中室上角之前发出, 共柄, 其中 R_{3-4} 合并至末端, 伸达翅顶角前方; M_1 自由, M_2 出自中室端脉中部或略近 M_1, 中室端脉下半段在模式种中向内凸出 1 尖角; CuA_1 不与 M_1 共柄, CuA_2 和 2A 正常。后翅 Sc+ R_1 与 Rs 合并至中室前缘中部; M_1、M_3 不共柄, M_2 存在或消失; Cu 脉正常, 2A 直, 3A 消失。

雄性外生殖器 大部分强骨化。钩形突三角形, 颚形突环状或在中部断离; 囊形突舌状, 延长; 阳端基环中部延伸出两条带状长突。抱器瓣短, 基部宽阔, 抱器背和抱器腹均骨化, 抱器腹端部有一至两个短刺状突; 抱器端近膜质, 其内侧有一瘤状突, 上着生数支骨化棘刺。阳茎细长。

雌性外生殖器: 见下文新种描述。

分布: 中国 (内蒙、新疆), 土库曼斯坦。

种检索表

1. 前翅 R_1 和 R_2 自由, 后翅 M_2 消失; ♂阳茎具 1 骨化倒刺 ………………………… 梭梭漠尺蛾, 新种 D. heloxylonia **Xue, sp. nov.**
   前翅 R_1 和 R_2 有 1 段合并, 或 R_1 与 Sc 合并, 或 R_2 与 R_{3-5} 合并, 后翅 M_2 存在; ♂阳茎无骨刺 …………………………………… 2
2. 前翅线纹模糊, 后翅浅灰褐色; 前翅 R_2 不与 R_{3-5} 合并; ♂阳端基环的两条带端半部与中部等宽 …… 土库曼漠尺蛾 D. nocturna
   前翅线纹清晰, 后翅灰白色; 前翅 R_2 与 R_{3-5} 合并; ♂阳端基环的两条带端半部急剧窄缩, 远狭于中部 ………………………………………… 阿拉善漠尺蛾 D. kozlovae

土库曼漠尺蛾 Desertobia nocturna **Viidalepp, 1989** (图 1~2)

Desertobia nocturna Viidalepp, 1989. *Trudy zool. Inst. Leningr.*, 200: 99, Figs. 1, 2a, 3a.

♂翅展 22~23 mm, ♀体长 5 mm。额较 *D. kozlovae* 更凸出, ♂触角纤毛状, 纤毛长度约为触角干直径的 3 倍。前翅色较下述两种深, 斑纹模糊。前翅 R_1 在基部与 Sc 合并, 中部与 R_2 合并; M_2 较接近 M_1, 中室端脉下半段弯折; 后翅 M_2 存在。雄

国家自然科学基金资助项目 (30470216).
收稿日期: 2005-11-24, 修订日期: 2005-11-27.

性外生殖器颚形突环状，中部不断离；阳端基环的两条带短宽；抱器端内侧的棘刺短小；阳茎无特化的骨刺。

分布：土库曼斯坦。

阿拉善漠尺蛾 Desertobia kozlovae **Viidalepp, 1989** (图 3~ 4)

Desertobia kozlovae Viidalepp, 1989. *Trudy zool. Inst. Leningr.*, 200: 100, figs. 2b, 3b.

♂翅展 25~ 27 mm。额平坦；触角略增粗。翅和翅面鳞片较光滑，前翅外线中部明显外凸。前翅 R_2 与 R_{3-5}短合并，后翅具 M_2。雄性外生殖器颚形突环状，中部不断离；阳端基环的两条带中部增宽，然后急剧窄缩，最大宽度大于上 3/4 处的 2 倍；阳茎无特化的骨刺。

分布：中国（内蒙古西部）。

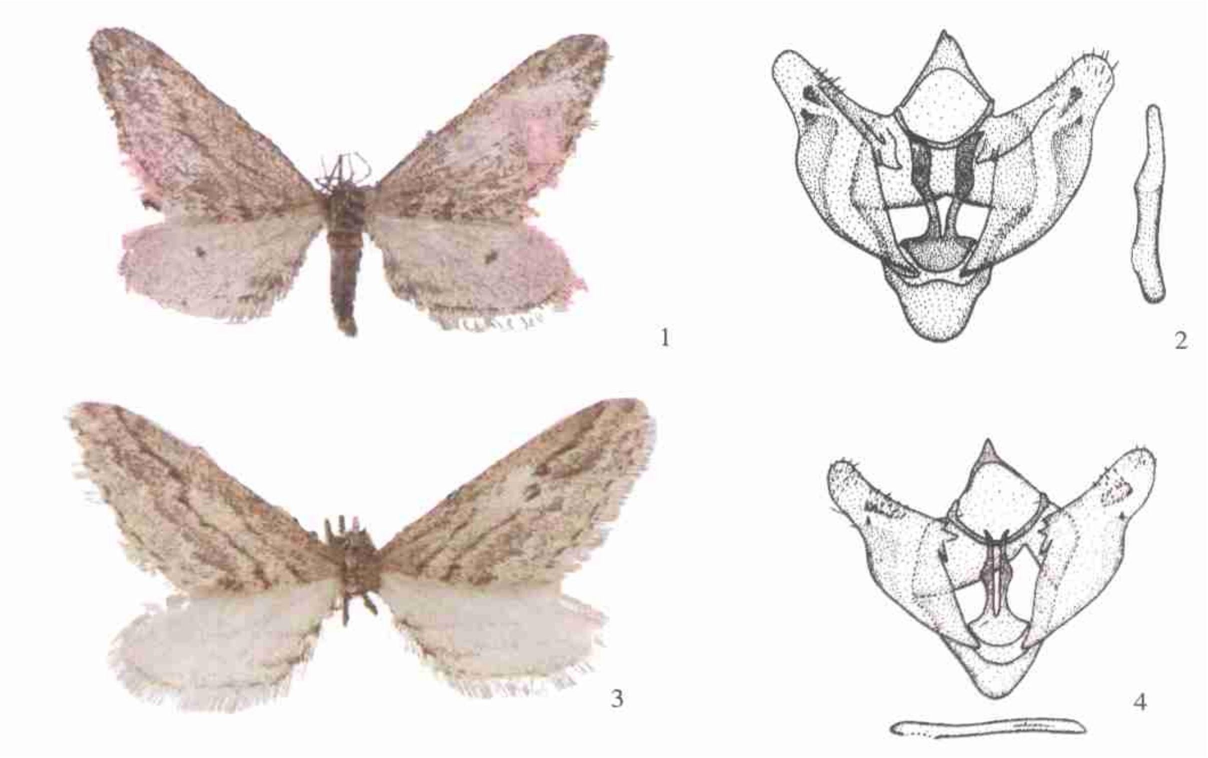

图 1~ 4 漠尺蛾属种类及 ♂外生殖器 (*Desertobia* spp. and male genitalia)
1~ 2. 土库曼漠尺蛾 *Desertobia nocturna* Viidalepp 3~ 4. 阿拉善漠尺蛾 *Desertobia kozlovae* Viidalepp. (1, 3. photoed by Dieter Stüning; 2, 4. after Jeen Viidalepp)

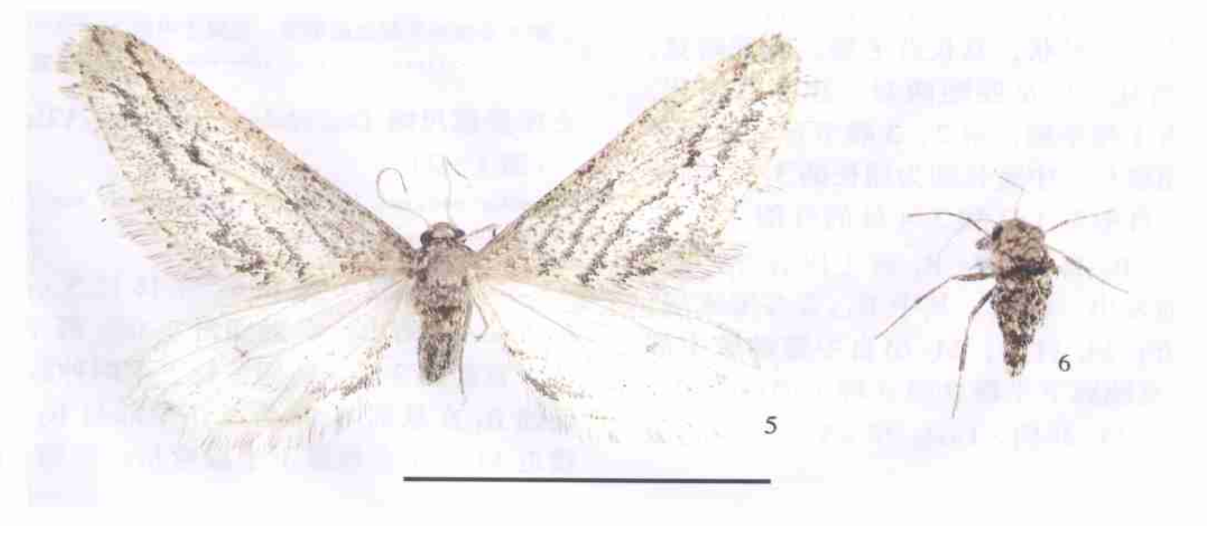

图 5~ 6 梭梭漠尺蛾，新种 *Desertobia heloxylonia* Xue, sp. nov.
5. 正模（holotype ♂) 6. 副模（paratype ♀）

梭梭漠尺蛾，新种 Desertobia heloxylonia **Xue, sp. nov.** （图 5～6）

头部　♂复眼直径 0.58 mm，额盾状，略凸出，上宽下窄，中部宽度与复眼直径相等；♀复眼小，直径 0.45 mm，额明显凸出，宽阔，中部宽度接近复眼直径的 2 倍。额中部灰褐色，边缘灰白色。♂触角（图 10）纤毛状，每节两对纤毛簇，位于各节中部和端部；♀触角线形。喙完全退化，下唇须短小细弱，尖端未到达额外，浅灰褐色。

胸腹部　浅灰褐色。♂胸部正常，♀胸部缩短，中胸背面隆起前倾，在头后盖住前胸，并形成一尖角。足细长，后足胫距两对，♂胫距较♀细长。第 1 腹节腹板（图 11）形成 1 个“∧”形骨化带，其两端连接腹听器，腹听器小，退化成指状小袋，听骨不可见。♂♀第 1 腹节背面近前缘处着生 1 排细刺，第 2、3 腹节相同位置各着生 1 排粗壮大刺，刺基部骨化并向前方扩展（图 12）。

翅　♂前翅长 11.5～12.5 mm；♀翅完全退化。♂翅狭长，前翅前缘直，顶角圆，外缘直，在 CuA_2 处微凹，后缘浅弧形，明显短于外缘。后翅前缘内 1/3 处浅凹，顶角圆，外缘在 CuA_2 处微凹，后缘平直。前翅浅灰褐色，线纹黑褐色；后翅灰白色，两翅均略带黄绿色调。前翅基部散布黑褐色鳞，内线、中线和外线均直，向顶角方向倾斜，其中外线到达顶角；中线内侧和外线外侧色较浅；有时可见微小黑色中点。后翅后缘端半部附近散布黑褐色鳞片，中点黑褐色。前后翅缘毛与翅面同色，特别长，其长度可达 1.2～1.5 mm。翅反面污白色，斑纹与正面相同但较模糊。

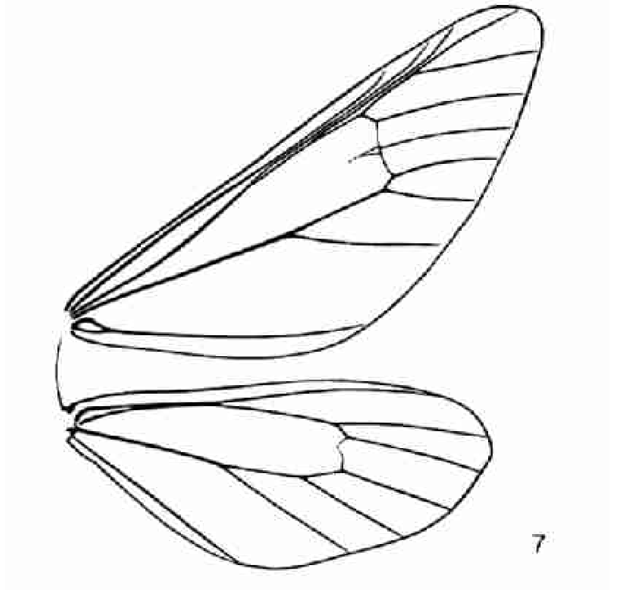

图 7　梭梭漠尺蛾，新种 *Desertobia heloxylonia* Xue, sp. nov.，翅脉（venation）

翅脉（图 7）中室长，前后翅均达其翅长的 2/3 以上。Sc、R_1、R_2 脉自由，R_1、R_2 脉分别出自中室前缘中部之外和近端部处；$R_{3\sim5}$ 共柄，出自中室上角前方，其中 $R_{3\sim4}$ 合并成 1 条，使 R 脉整体呈 4 分支；M_1 脉出自 R_{3-5} 外下方，远离 R 脉；中室端脉直，下端略向外弯折，M_2 出自中室端脉中部；M_3 不与 CuA_1 共柄，CuA_2、A_1+A_2 无特化。后翅 $Sc+R_1$ 与 Rs 合并超过中室中部；Rs 出自中室上角前方，远离 M_1；中室端脉上半段浅弯折，下半段直，M_2 消失；CuA_1 远离 M_3，不共柄；2A 直，无 3A。

♂外生殖器（图 8）　钩形突三角形，颚形突的环在中部断离，形成相对的细尖，端部有微刺；囊形突长度与钩形突相仿；阳端基环中部的两条带状长突伸达颚形突上方，中部略膨大。抱器瓣同属征描述，抱器腹端部有两个短刺状突。细长的阳茎端部有一骨化倒刺。

♀外生殖器（图 9）　肛瓣细长，中度骨化，多毛；其下第 9+10 腹节形成的膜质套管特别延长。第 8 腹节骨化，散布刚毛。前后表皮突均细长。产卵孔周围杯状骨化，囊导管和囊体膜质，弱小，无囊片。

幼期及生物学（图 13～20）　初产卵黄绿色，椭圆形，成片产于寄主枝干上（图 15）。幼虫（图 16～17，20）细长，光滑，圆柱形，浅褐色，与梭梭第 2 年幼枝拟态，腹部各节侧面有不规则黑褐色斑块，末龄幼虫长约 2 cm。蛹（图 18）褐色，发现于距地表 60 cm 深的沙层中，蛹体长：7.0～7.5 mm，宽 2.1～2.3 mm。幼虫寄主植物包括梭梭（梭梭柴）*Haloxylon persicum* Bunge ex Boiss. *et* Buhse，白梭梭 *H. ammodendrom*（Mey.）Bunge，白皮沙拐枣 *Calligonum leucocladum*（Schrenk）Bge. 及沙拐枣 *C. mongolicum* Turcz.。其中梭梭在古尔班通古特沙漠中为主要植物，也是本种的主要寄主。

鉴别特征　新种外观与阿拉善漠尺蛾 *D. kozlovae* Viidalepp 十分接近，但是前翅外线较直，阿拉善漠尺蛾外线中部明显外凸。新种翅脉在下述各点区别于 Viidalepp 命名的两个已知种：前翅 R_1 与 R_2 自由，不与任何脉接触或合并；后翅 M_2 脉消失。M_1 与 M_3 互相接近，第 3 腹节背面的刺较细但较多。♂阳端基环的两条带在 3 个种中均不相同，新种接近 *D. kozlovae*，但中部膨大不明显。阳茎端部的骨化倒刺在另外两个种中均不存在。

正模 ♂，新疆古尔班通古特沙漠，2005-03-24，李桂花、邢海洪采。副模：10 ♂♂，12♀♀，同正

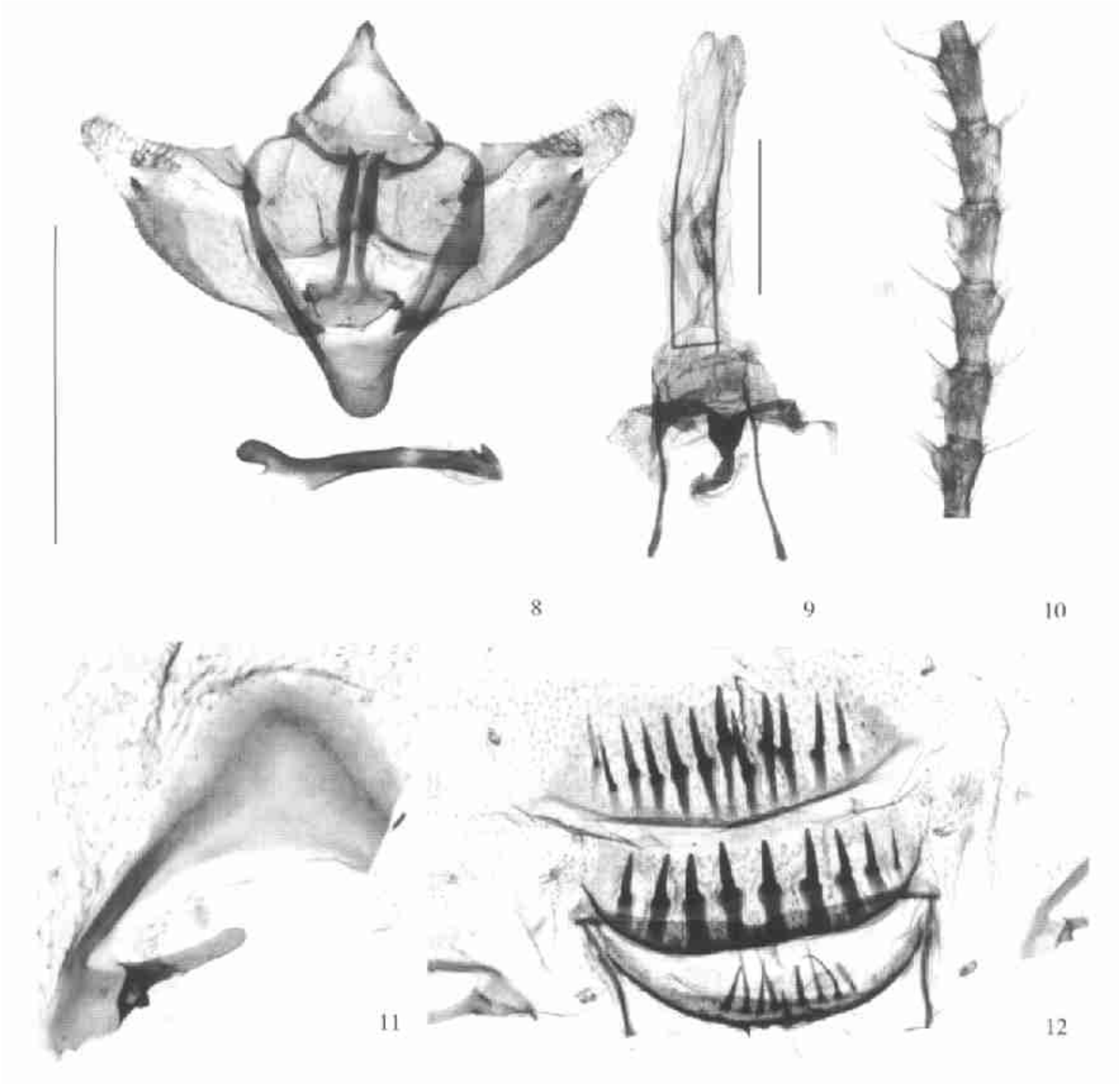

图 8~ 12 梭梭漠尺蛾，新种 *Desertobia heloxylonia* Xue, sp. nov. 成虫形态 (adult morphology)
8. ♂外生殖器 (male genitalia) 9. ♀外生殖器 (female genitalia) 10. ♂触角 (antenna) 11. 第 1 腹节腹板及听器 (first sternite and tympanal organ) 12. 第 1~ 3 腹节背板 (1- 3 tergites) 比例尺 (Scale bars) : 8~ 9= 1 mm

模; 3♀♀, 新疆古尔班通古特沙漠 148 团, 2005-04-04, 李桂花采。

词源: 新种名来源于其主要寄主梭梭的属拉丁名 *Haloxylon*。

分布: 中国 (新疆)。

致谢 (**Acknowledgements**) 作者感谢 Jaan. Viidalepp 教授 (爱沙尼亚科学院动植物研究所, 爱沙尼亚塔图 (Institute of Zoology and Botany of Acad. Sci., Tartu, ESSR)) 和 Dieter Stüning 博士 (Koenig 动物学博物馆, 德国波恩 (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany)) 为本文工作提供文献和部分图片; Viidalepp 教授还帮助翻译文献中的部分俄文内容。

图 13~ 20 梭梭漠尺蛾, 新种 *Desertobia heloxylonia* Xue, sp. nov. 虫态与生境 (stages and habitat)
13. ♂成虫 (male) 14. ♀ 成虫 (female) 15. 卵 (eggs) 16-17. 幼虫 (larva) 18. 蛹 (pupa) 19. 沙漠中的梭梭林 (the *Haloxylon* plants in desert) 20. 准备入土化蛹的幼虫 (mature larvae) (13~ 17 由邢海洪摄, 18~ 20 由施登明摄)
(13-17. photoed by XING Hai-Hong, 18-20. photoed by SHI Deng-Ming)

REFERENCES (参考文献)

Scoble, M. J. (ed.) 1999. Geometrid Moths of the World: A Catalogue (Lepidoptera, Geometridae). Vol. 1, 2. xxv+ 1016 pp. CSIRO, Colingwood.

Viidalepp, Ja. R., 1989. A new genus and a new tribe of the geometrid moths (Lepidoptera, Geometridae: Desertobiini, trib. n.) from Middle and Central Asia. *In*: Fal' Kovich, M. I. (ed.), Lepidoptera of Middle Asia. Trudy zool. Inst. Leningr. 200: 94-109.

A STUDY ON THE GENUS *DESERTOBIA* VIIDALEPP, WITH DESCRIPTION OF A NEW SPECIES (LEPIDOPTERA, GEOMETRIDAE, ENNOMINAE)

XUE Da-Yong[1], SHI Deng-Ming[2], XING Hai-Hong[3], HAN Hong-Xiang[1], LI Gui-Hua[3]

1. *Institute of Zoology, Chinese Academy of Sciences, Beijing* 100080, *China; xuedy@ioz.ac.cn*
2. *Forestry Deparment of Xinjiang Agricultural University, Wulumuqi* 830052, *China*
3. *Station of Forestry Pest Protection and Quarantine, Shihezi* 832000, *China*

Abstract In this paper the genus *Desertobia* Viidalepp is studied. All the known species are treated, and a new species *D. heloxylonia* Xue, sp. nov. is described from Xinjiang, China. All the adults and male genitalia are illustrated and described. The female genitalia is illustrated and described for the first time to the genus. *Desertobia heloxylonia* is an important pest to *Haloxylon* in the desert. Its immature stages and habitats are illustrated and briefly reported. The type specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, except one pair of paratypes deposited in the Museum of Forestry Department of Xinjiang Agricultural University, Urumchi, Xinjiang, China, and another pair of paratypes deposited in the Station of Forestry Pest Protection and Quarantine, Shihezi, Xinjiang, China.

Desertobia heloxylonia **Xue, sp. nov.** (Figs. 5-6)

Head. Diameter of eyes 0.58 mm in male, 0.45 mm in female. Frons grey-white, with a grey-brown patch at center; frons in male protruding slightly, peltate (broad at upper part and narrow at lower part), equal to diameter of eyes at middle in width; female with frons protruding moderately, broad, width at middle about two times of diameter of eyes. Antenna ciliate in male (each segment with two pairs of cilia at apical and middle), simple filiform in female. Tongue obsolete. Labial palpus short and weak, pale grey-brown, not extending out of frons.

Thorax and abdomen. Pale grey-brown. Thorax in male normal; in female shortened, dorsal side of mesothorax protruding and oblique forward, covering prothorax and forming a sharp angle. Legs long and slender; hind tibia with two pairs of spurs, length of spurs in male longer than in female. Abdomen (Fig. 12) with tergite A1 to A3 having a transverse row of spines anteriorly, weak and thin on tergite A1, the spines on tergite A2 and A3 quite developed, with base sclerotized and expanded anteriorly. Sternite one (Fig. 11) froming a "∧"-shaped sclerotized band, lateral side connected with tympanal organ, which quite small and reduced to a finger-like bag-process, ansa invisible.

Wings. Length of forewing in male: 11.5-12.5 mm, wingless in female. Forewing narrow and long; costa straight; apex rounded; the outer margin almost straight; the inner margin slightly curved, shorter than outer margin. Hindwing with apex rounded, inner margin straight. Forewing pale grey-brown, streaks black brown, hindwing grey-white; both wings lightly diffused with yellow-green. Forewing diffused black-brown at base of wing, antemedial, medial and postmedial lines straight, inclined to apex, and the postmeidal line reaching apex; the inner side of medial line and the outer side of postmedial line pale; sometimes small black discal spot visible. Hindwing diffused black-brown scales near anal angel; discal spot black-brown. Fringes very long (1.2-1.5 mm in length), same colour with wings. Underside: dull white, streaks similar to the upper side and much paler.

Venation (Fig. 7). Both wings with cell large, longer than two-third of wing length. Forewing: Vein Sc, R_1 and R_2 free, both R_1 and R_2 diverging from cell; R_{3-5} stalked, diverging before upper angel of cell, R_{3-4} stalked totally; M_1 far from R_{3-5}; discocellulars almost straight; M_2 from middle of DC; M_3 and CuA_1 separate; CuA_2, $A_1 + A_2$ not modified. Hindwing: Sc + R_1 anastomosing with Rs until after middle of cell; Rs before cell angle, far from M_1; DC with upper half angled and with lower half straight; M_2 missing; M_3 and CuA_1 separate; 2A straight, 3A missing.

Male genitalia (Fig. 8). Uncus triangular, sclerotized. Gnathos strongly sclerotized, with a pair of lateral spinulose processes, tapered. Saccus developed, rounded. Juxta rounded, with a pair of long, band-like, strongly sclerotized processes, slightly expanded at middle. Valva with two tiny processes at end of sacculus, and with a patch of strong setae subapically. Aedeagus sclerotized, with a triangular process at posterior end.

Female genitalia (Fig. 9). Ovipositor setose. Joined segment 9 and 10 very long. Apophyses anteriores and posteriores very long. Segment 8

sclerotized, setose. Cup-shaped, sclerotized region present around ostium. Ductus bursae and corpus bursae membranous, corpus bursae small, signum absent.

Immature stages and biology (Figs. 13-20). Eggs yellow-green, oval, gathered on branches (Fig. 15). Larva (Figs. 16-17, 20) long and slender (oldest larva about 2 cm in length), columniform, pale brown, looks like fresh branches of *Haloxylon*, with irregular black-brown patch on lateral side of each segment. Pupae (Fig. 18) was found under the ground at depth of 60 cm, 7.0-7.5 mm in length, and 2.1-2.3 mm in width.

Hosts. *Haloxylon persicum* Bunge ex Boiss. *et* Buhse, *H. ammodendrom* (Mey.) Bunge, *Calligonum leucocladum* (Schrenk) Bge. and *C. mongolicum* Turcz. *H. persicum* is the main plant in Guerbantonggute desert and main host of this species.

Diagnosis. *Desertobia heloxylonia* is similar to *D. kozlovae* Viidalepp in wing pattern, but it can be distinguished from the latter by the following characters: postmedial line of forewing is much straighter than that in *D. kozlovae*, in which postmedial line protruding outwards at middle; vein M_2 on hindwing is absent in *D. heloxylonia*; aedeagus in *D. heloxylonia* bears a sclerotized pointed process at the end, whereas such process is absent in the other two known species of the genus; the developed processes on juxta of *D. heloxylonia* is close to that of *D. kozlovae*, but the middle part expanded not so distinctly as in the latter species.

Etymology. The species name is from the genus name of host plant.

Holotype ♂, Xinjing, Desert Gurbantunggut, 24 May 2005, coll. LI Gui-Hua and XING Hai-Hong. Paratypes: 10 ♂♂, 12♀♀, same as holotype; 3♀♀, Xinjing, Desert Gurbantunggut, 148 Tuan, 4 Apr. 2005, coll. LI Gui-Hua.

Distribution. Xinjing, China.

Key words Geometridae, Ennominae, *Desertobia*, new species, China, desert, *Haloxylon*.